UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/885,171	06/21/2001	Yang-lim Choi	Q64026	4000

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EXAMINER
SAJOUS, WESNER

ART UNIT	PAPER NUMBER
2676	

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

Period for Reply

   A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
   THE MAILING DATE OF THIS COMMUNICATION.
   - Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
     after SIX (6) MONTHS from the mailing date of this communication.
   - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
   - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
   - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
   - Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
     earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _2/1/2005_ .

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _2-14,20 and 22-24_ is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _8,9,11 and 12_ is/are allowed.

6)☒ Claim(s) _2-7,10,13,14 and 20_ is/are rejected.

7)☒ Claim(s) _22-24_ is/are objected to.

8)☐ Claim(s) _ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

   If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
         application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

   a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)   4)☐ Interview Summary (PTO-413) Paper No(s). _____ .

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)   5)☐ Notice of Informal Patent Application (PTO-152)

3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .   6)☐ Other:

DETAILED ACTION

Remark

This communication is responsive to the amendment and response filed on February 1, 2005. Claims 2-14, 20, 22-24 are now presented for examination. Claims 21-24 are newly added.

Response to Arguments

1.   The Applicants, at pages 11 and 12 of the response, argue that the Kuehl reference does not teach or suggest "... connecting pixels having a same level on direction maps of a plurality of directions to obtain the first list of straight lines."

In response, the Examiner respectfully disagrees. Kuehl discloses the use of a program to compute connection codes from a skeleton map, which is stored in a memory to form a description in terms of the pixels stored therein. The computation scans the skeleton row by rows, and the pixels in that row are connected to adjacent rows, wherein the connection codes indicate line length and directions in the rows. See col. 8, line 58 to col. 9, line 7. The rows of the skeleton map being scanned are referred to lines and are made of pixels. See col. 11, lines 5-18. Thus, by these citations, it is apparent that Kuehl enables the connections of pixels of a same level on direction maps (e.g., connecting pixels row by rows) to derived lists of straight lines, as claimed. Kuehl does not just describe the disposition of the pixels in the skeleton map. Kuehl discloses connecting pixels based on connection codes. Therefore, the Applicants arguments are not deemed persuasive. The rejections are maintained.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 2-7, 10, 13-14 and 20 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Nishida (US Pat. 5497432) in view of Kuehl (US 5428692).

Considering claim 2, Nishida discloses most claimed features of the invention as

set forth in the previous office action, paper # 13; however, Nishida fails to teach

obtaining a first list of straight lines by connecting pixels having a same level on

direction maps of a plurality of directions, based on the extracted skeleton.

Kuehl, in a similar art, teaches the functional equivalence for obtaining a first list

of straight lines by connecting pixels having a same level on direction maps of a plurality

of directions (e.g., left, right, top and bottom connection directions), based on the

extracted skeleton. See col. 11, lines 4-58. It is to be noted that if pixels that form a line

are connected from left to right or straight down (see fig. 1F), the connected pixels need

be in the same level on a direction map, in order to have a straight line.

Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to modify the features of Nishida to include the pixel

connection directions in the same conventional manner as taught by Kuehl; so as to

provide an optical character recognition system that is capable of automatic recognition of characters in a character set. See Kuehl's col. 1, lines 8-12.

Re claim 3, Nishida discloses obtaining a distance map by performing a distance transform on the input image; and extracting a skeleton from the distance map. See col. 5, lines 40-60, wherein the distance map is characterized by the calculated height and weight of the character string.

As per claim 4, Nishida discloses thinning the extracted skeleton; and extracting straight lines by connecting respective pixels within the thinned skeleton (as performed by steps 121-125 of fig. 1, see also figs. 5-6).

Re claim 5, Nishida discloses making a list of starting point and ending points of the connected lines (see fig. 7, wherein Nos. 0-18 correspond to the lines, and the min and max coordinates associated with the lengths correspond with the distance between end points of the lines). In addition, Nishida discloses a first list of straight lines (i.e., lines 0-18, see fig. 6) by a straight lines combination of the extracted lines (see figs. 5-6); and determining a second list of straight lines [inherent in fig. 15], obtained by normalizing (e.g., via the algorithms depicted at figs. 7-14), the first list of straight lines (fig. 6) based on the maximum distance between ending points of respective lines as a shape descriptor. See col. 7, lines 10-45 and col. 8, line 53 to col. 10, line 10.

Re claim 6, Nishida [inherently] discloses (via fig. 7) the equivalence for a distance transform based on a function indicating respective points within an object with the minimum distance value of the corresponding point from [a] background. See col. 6, line 2 through col. 12, line 18.

As per claim 7, Nishida the equivalence for discloses obtaining a local maximum (Xmax) from the distance map (i.e., LENGTH associated with the max and min coordinates, see fig. 7) using an edge detecting method (as characterized by the disclosure at col. 9, lines 18-35.

Regarding claim 10, Nishida discloses the input image is a binary image. See cols. 4-5, line 65-3.

As per claim 13, Nishida discloses the equivalence for performing a straight-line combination (see figs 8-10) by [inherently] changing threshold values of an angle between the straight lines, a distance and a length of a straight line (as depicted in figs. 8-10) from the obtained first list of straight lines (as depicted in fig. 6). Note that each of the lines depicted in figs. 8-10 for the combination of characters includes a length and distance associated with the lines of fig. 6, and to combine the pieces of lines together, a threshold value associated with the lines must be calculated, so as to make a valid connection between the lines to result to a complete character.

As per claim 14, the claimed "repeating the straight line combination until the number of remaining straight lines becomes equal to or less than a predetermined number" is inherently performed in Nishida, because in Nishida all the pieces of lines (i.e., lines 8-8 to 8-12) associated with a character (i.e., character 5) must be accounted for in the min and max coordinates calculation before the desired outcome is achieved.

As per claim 20, Nishida discloses obtaining a map of the input image (see fig. 3); and extracting a skeleton (see fig. 4) from the obtained map.

Allowable Subject Matter

4.   Claims 8-9, 11-12 are allowed over the prior art because the Applicant, by

amendments, has incorporated allowable subject matters into their rejected base

claims.

5.   Claims 22-24 are objected to as being dependent upon a rejected base claim,

but would be allowable if rewritten in independent form including all of the limitations of

the base claim and any intervening claims, because the prior art of record fail to teach

using the direction map of four directions, and making a list of starting and ending points

of respective line segments by connecting pixels having the same level on direction

map.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Sajous Wesner whose telephone number is 571-272-

7791. The examiner can normally be reached on Mondays thru Fridays between 11:00

AM and 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Matthew Bella can be reached on 571-272-7778. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Wesner Sajous -WS-

6/1/05

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